

**ABSTRACT**

A MOSFET transistor structure is formed in a substrate of semiconductor material having a first conductivity type. The MOSFET transistor structure includes an active region that is surrounded by a perimeter isolation dielectric material formed in the substrate to  
5 define a continuous sidewall interface between the sidewall dielectric material and the active region. Spaced-apart source and drain regions are formed in the active region and are also spaced-apart from the sidewall interface. A conductive gate electrode that is separated from the substrate channel region by intervening gate dielectric material includes a first portion that extends over the substrate channel region and a second portion that extends continuously  
10 over the entire sidewall interface between the isolation dielectric material and the active region. Thus, an enclosed ring is maintained around the entire composite perimeter, thereby completely avoiding regions of high trap density and, thus, preventing any current path for gate induced drain leakage (GIDL) to occur.